

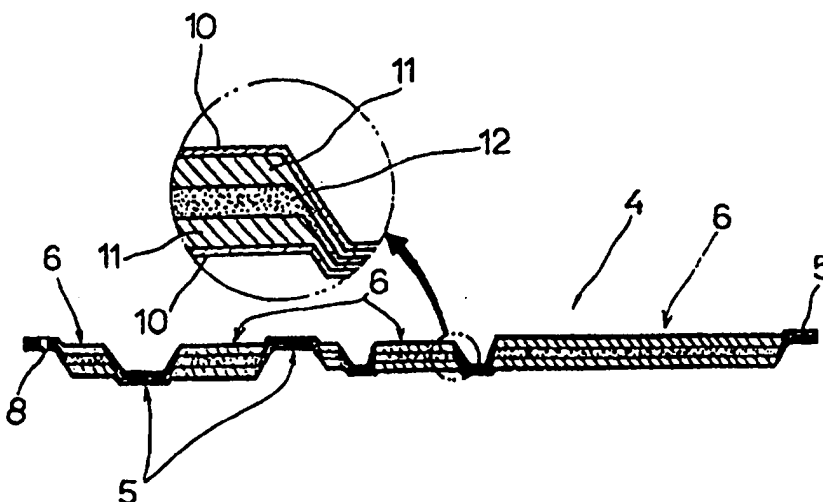


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/KR97/00118 <b>(22) International Filing Date:</b> 20 June 1997 (20.06.97)  <b>(30) Priority Data:</b> 1996/22837      21 June 1996 (21.06.96)      KR  <b>(71) Applicant (for all designated States except US):</b> DAEHAN CHEMICAL IND. CO., LTD. [KR/KR]; 9 Block 9 Lot, 616- 6, Namchon-dong, Namdong-gu, Inchon 405-100 (KR).  <b>(72) Inventor; and</b> <b>(75) Inventor/Applicant (for US only):</b> KWON, Hoe, Hyon [KR/KR]; H-906 Hanyang Apartment, 42, Yoido-dong, Yeongdeungpo-gu, Seoul 150-010 (KR).  <b>(74) Agent:</b> LEE, Dae, Sun; 6F Chongkundang Building, 441, Shipchong-2dong, Pupyong-gu, Inchon 403-132 (KR).		<b>(81) Designated States:</b> CN, HU, JP, PL, US, UZ, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** MULTILAYERED INSULATION SHEET**(57) Abstract**

This invention relates to a multilayered insulation sheet which could effectively reduce the noise level of the inner and outer spaces of the vehicles. According to the invention, there is provided an insulation sheet comprising a foamed plastic layer (12), resin felt layers (11) disposed on either side of said foamed plastic layer (12) and cover sheet (10) which covers the surfaces of said resin felt layers (11), and said insulation sheet (4) is sectioned into the high density region (5) which is made by relatively higher pressured pressing and includes at least the marginal areas of sheet and the low density region (6) which is made by relatively lower pressured pressing and includes the rest areas except said high density region (5).



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## DESCRIPTION

## Title of Invention

Multilayered Insulation Sheet

## Technical Field

This invention relates to a multilayered insulation sheet, and in particular to a multilayered insulation sheet which could effectively reduce the noise level of inner and our space of the vehicles.

## Background Art

Insulation sheets are attached on proper parts of automobiles. These insulation sheets are used to shut off or absorb the noises and vibrations and harshness called N. V. H. for the purpose of quiet and comfortable driving condition.

The known insulation sheets are disposed mainly on the floor panel, door panels, partition between engine room and passenger compartment or partition between passenger compartment and trunk room. These insulation sheets are used to prevent the noise and vibration generating from an engine or powertrain from transmitting or passing into the passenger compartment. But, the design for noise insulation oriented to a quiet passenger compartment could not satisfy the consumer's high

requirement for enhanced standard of quiet cars.

Moreover, the noises going out from the engine room towards the open space may increase directly the noise level of road, and these noises may return to the passenger compartment, which results in increasing the noise of passenger compartment.

Meanwhile, the known insulation sheets are generally composed of one sheets or multilayer sheets which are uniformly pressed to be shaped to predetermined forms. But, those uniformly pressed insulation sheets could not achieve the desired absorption of noises, shape sustenance and workability in attaching process against the panels of vehicles.

#### Disclosure of Invention

One object of invention is to solve the above mentioned problems in relation with the insulation sheets of automobiles and to provide insulation sheets which could effectively reduce the noises going out from the engine room towards the outside of automobiles.

Another object of invention is to provide the insulation sheet which has enhanced property of insulation and shape-sustenance and workability in attaching process.

According to one feature of the invention, there is provided an insulation sheet(4) which is disposed on the inner surface of engine hoods(3) which cover the engine room(2) of vehicle body(1).

According to another feature of the invention, said insulation sheet(4) is comprising a foamed plastic layer(12), resin felt layers(11) disposed on either side of said foamed plastic layer(12) and cover sheet(10) which covers the surfaces of said resin felt layers(11), and said insulation sheet(4) is sectioned into the high density region(5) which is made by relatively higher pressured pressing and includes at least the marginal areas of sheet and the low density region(6) which is made by relatively lower pressured pressing and includes the rest areas except said high density region(5).

According to another feature of the invention, there is provided of an insulation sheet comprising a foamed plastic layer(12), resin felt layers(11) disposed on either side of said foamed plastic layer(12) and cover sheet(10) which covers the surfaces of said resin felt layers(11), and said insulation sheet(4) is sectioned into the high density region(5) which is made by relatively higher pressured pressing and includes at

least the marginal areas of sheet and the low density region(6) which is made by relatively lower pressured pressing and includes the rest areas except said high density region(5).

#### Brief Description of Drawings.

The invention will be descibed in more detail with reference to the drawings in which :

Fig. 1 is a view showing an exemplary use of the embodiment of the invention.

Fig. 2 is a perspective view of said embodiment.

Fig. 3 is a sectional view according to line A-A of Fig. 2.

#### Best Mode for Carrying out The invention

Referring to the Figures, there is provided an insulation sheet(4) which is disposed and attached to the inner surface of engine hood(3) which covers the engin room(2) of the vehicle body(1). This insulation sheet(4) may be attached to the inner surface of engine hood(3) by means of screw(7). But, other attaching means such as adhesive may be used.

This insulation sheet(4) is made of soft and porous multilayer materials which comprising foamed plastic layer, resin felt layer and

non-woven fabric layer.

In the preferred embodiment shown in Fig. 3, the foamed plastic layer(12) such as polyurethane sponge is disposed in the middle part of multilayer and the resin felt layers(11) made of resin-impregnated felt are disposed on both surfaces of foamed plastic layer(12), and non-woven fabric layers(10) are disposed on the outer surface of resin felt layers(11). If necessary, the non-woven fabric layers(10) may be treated by water-resistant agents.

These insulation sheets(4) may be formed in conformity with the contour of the vehicle body or the shape of vehicle components. As the multilayer sheets made of soft and porous materials are relatively low in shape-sustenance and workability, the marginal areas and intermediate areas of the insulation sheet or fastening areas against vehicle body should be pressed with relatively high pressure to become thinner and rigid high-density regions(5), whereas rest areas of sheets should be pressed with relatively low pressure to become thicker and soft low-density regions(6). Those structure will enhance the insulation property as well as the shape-sustenance and workability. The screw(7) will be fastened at the high density region(5) so that the insulation sheet should be attached against the vehicle body.

According to the invention as described above, as the insulation sheets should be attached on the inner surface of engine hoods(3), the noises going out from the engine room could be effectively reduced, which will firstly reduce the noise level of road on which the car is driving, and will secondly reduce the returning noise from outside the vehicles to the passenger compartment, and finally resulting in more comfortable and quiet driving conditions. In addition, as multilayered insulation sheets comprising soft and porous materials and being sectioned into high density region and low density region will enhance the insulation property as well as the shape-sustenance and workability.



## CLAIMS

1. An insulation sheet(4) which is disposed on the inner surface of engine hood(3) which cover the engine room(2) of vehicle body(1).

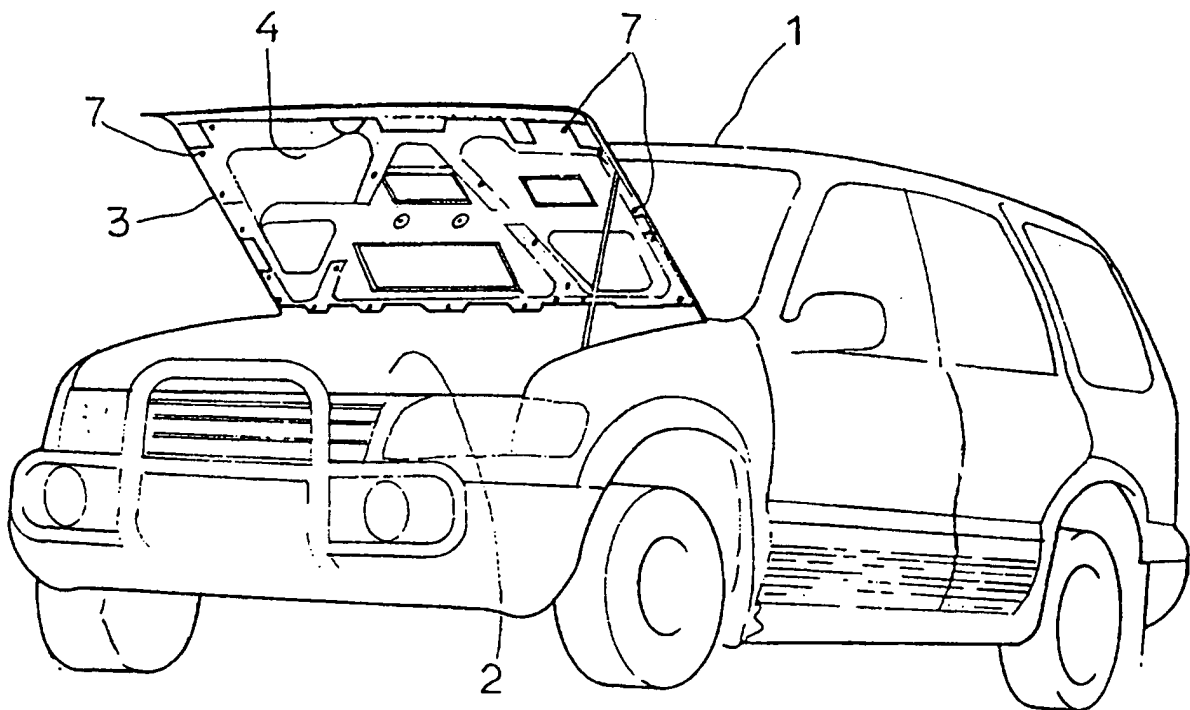
2. An insulation sheet according to claim 1 wherein said insulation sheet(4) is comprising a foamed plastic layer(12), resin felt layers(11) disposed on either side of said foamed plastic layer(12) and cover sheet(10) which covers the surfaces of said resin felt layers(11), and said insulation sheet(4) is sectioned into the high density region(5) which is made by relatively higher pressured pressing and includes at least the marginal areas of sheet and the low density region(6) which is made by relatively lower pressured pressing and includes the rest areas parts except said high density region(5).

3. An insulation sheet comprising a foamed plastic layer(12), resin felt layers(11) disposed on either side of said foamed plastic layer(12) and cover sheet(10) which covers the surfaces of said resin felt layers(11), and said insulation sheet(4) is sectioned into the high density region(5) which is made by relatively higher pressured pressing and includes at least the marginal areas of sheet and the low density

region(6) which is made by relatively lower pressured pressing and includes the rest areas except said high density region(5).

$\frac{1}{2}$

FIG. 1



2/2

FIG. 2

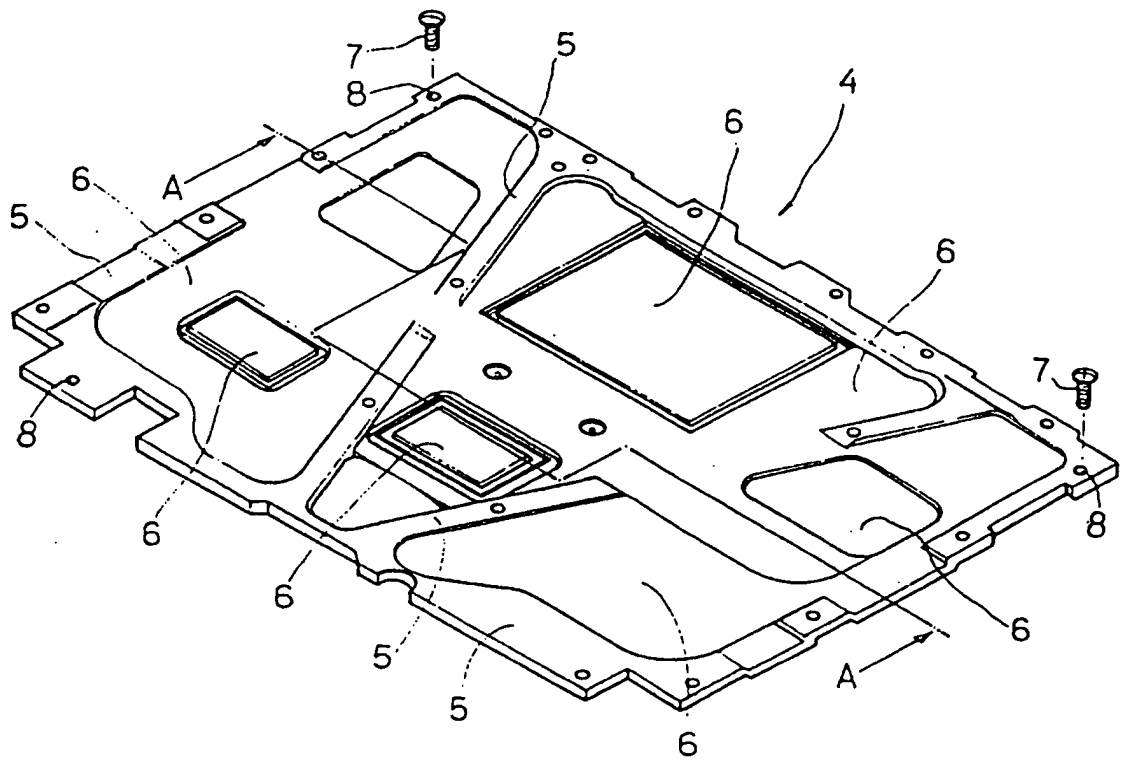
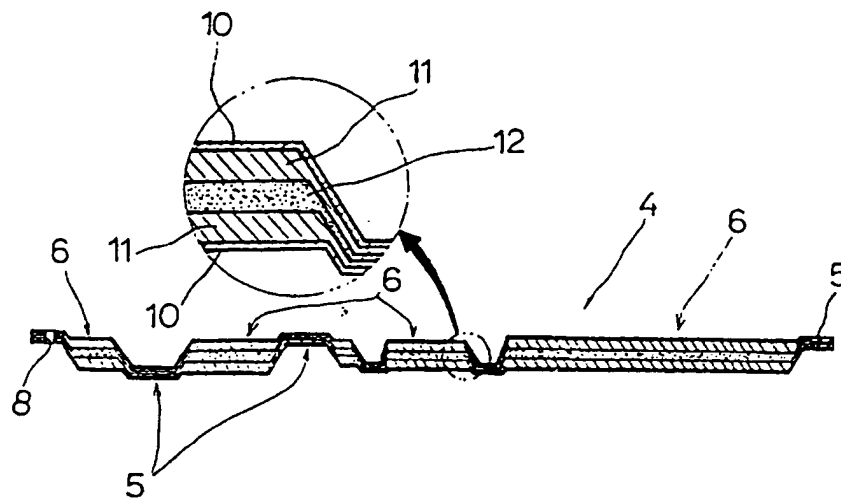


FIG. 3



# INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR 97/00118

## A. CLASSIFICATION OF SUBJECT MATTER

IPC<sup>6</sup>: B 60 R 13/08; B 62 D 25/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC<sup>6</sup>: B 60 R 13/00,13/08; B 62 D 25/08,25/10,29/00,29/04; B 32 B 5/18,5/26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X Y	DE 39 03 471 A1 (H.P.CHEMIE) 31 August 1989 (31.08.89), column 1, lines 22-51; column 4, lines 20-32.	1 2,3
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A	US 4 646 864 A (RACCHI) 03 March 1987 (03.03.87), totality.	1-3
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Date of the actual completion of the international search

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International application No.

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